

9 (Once Amended)

A beverage dispenser apparatus for dispensing through a nozzle a preestablished volume of a syrup and a preestablished volume of a soda to be intermixed within said nozzle, said beverage dispensing apparatus comprising:

a soda inlet for connection to a source of soda under pressure;

a syrup inlet for connection to a source of syrup;

a syrup section connected to said syrup inlet utilizing a first drive piston, said first drive piston moves to cause dispensing of said preestablished volume of syrup into said nozzle, said first drive piston being movable in both a forward and reverse direction within a syrup drive piston chamber, said syrup in said preestablished volume to be dispensed during movement of said first drive piston in said forward direction and also during movement in said reverse direction;

a soda section utilizing a second drive piston, said second drive piston moves to cause dispensing of said preestablished volume of soda into said nozzle, said second drive piston being movable in both said forward and said reverse direction within a soda drive piston chamber, soda in said preestablished volume to be dispensed during movement of said second drive piston in said forward direction and also during movement in said reverse direction, said soda drive piston chamber being

spaced from said syrup drive piston chamber, wherein said first drive piston is connected to said second drive piston so both said first drive piston and said second drive piston move together in said forward direction and together in said reverse direction; and

5 a completely liquid driven control [drive control] located between and connected between the soda inlet and the soda drive piston chamber, and powered by soda pressure through the soda from the soda inlet, the control piston  
10 [drive control] having an on state in which soda under pressure is routed to alternate sides of the second drive piston to cause reciprocal motion of the first and second drive pistons, and having an off state in which soda under pressure is routed to prevent movement of the first  
15 and second drive pistons.

10 (Once Amended)

The beverage dispensing apparatus of Claim 9 wherein:

20 said control piston [drive control includes] comprises first and second slide pistons, the first slide piston being physically contactable and movable by said second drive piston during movement in said forward direction, and the second slide piston being physically contactable by said second drive piston during movement in said reverse  
25 direction.

12 (Once Amended)

The beverage dispensing apparatus of Claim 9 wherein the control piston [drive control] includes:

5 first and second soda inlet valves for selectively connecting first and second ends, respectively, of the soda drive piston chamber to the soda inlet.

14 (Once Amended)

10 The beverage dispensing apparatus of Claim 13 wherein the control piston [drive control] includes:

15 first and second valves associated with the first and second ends of the soda piston drive cylinder for switching fluid connections in the control piston [drive control] each time the second drive piston approaches one of the first and second ends.

18 (Once Amended)

The beverage dispensing apparatus of Claim 9 and further comprising:

20 an on/off control connected to the control piston [drive control] for determining whether the control piston [drive control] is in the on state or off state.

Claims 19-26 Allowed

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25 (Once Amended - Allowed)

A dispensing valve for simultaneously dispensing from a nozzle a predetermined volume of a first liquid and a predetermined volume of a second liquid, the beverage dispensing valve comprising:

5 a valve body having a first inlet for connection to a pressurized source of the first liquid and a second inlet for connection to a source of second liquid;

a first section of the valve body having a drive piston, the drive piston being reciprocable within a drive piston chamber in a forward direction toward a drive piston chamber first end and in a reverse direction toward a drive piston chamber second end;

10 a second section of the valve body connected to the second liquid inlet having a driven piston, the driven piston being reciprocable within a driven piston chamber between first and second ends thereof respectively and the driven piston chamber having a predetermined volume, the drive piston chamber being spaced from the driven piston chamber and the drive piston connected to the driven piston so that both the drive piston and the driven piston move together in a coordinated manner;

15 a fluid powered shifting system in the valve body for causing the drive piston to reciprocate in the drive piston chamber alternatively in the forward and reverse directions, the fluid powered shifting system including:

first and second slide pistons, the first and second  
slide pistons reciprocable within the first and  
second slide piston chambers respectively and the  
first and second slide pistons being physically  
5 connected together so as to be movable in a  
coordinated manner, and the first slide piston  
being physically contactable and movable by the  
drive piston during movement thereof in the forward  
direction as the drive piston moves adjacent the  
10 drive piston chamber first end for moving the first  
and second pistons to a first shifting piston, and  
the second slide piston being physically  
contactable and movable by the drive piston during  
movement thereof in the reverse direction as the  
15 drive piston moves adjacent the drive piston  
chamber second end for moving the first and second  
slide pistons to a second shifting position;

a first liquid inlet valve in fluid communication with  
the first liquid inlet, the first liquid inlet  
20 valve operable by fluid pressure to a first  
position for directing the first fluid through a  
first flow channel into the drive piston chamber  
first end and for blocking flow of the first liquid  
through a second flow channel into the drive piston  
25 chamber second end, and operable by fluid pressure  
to a second position for directing the first fluid

through the second flow channel into the drive piston chamber second end and for blocking flow of the first liquid through the first flow channel into the drive piston chamber first end;

5 an outlet flow channel for providing fluid communication from the first and second flow channels to the nozzle;

a first fluid control comprising a plurality of first fluid passageways for providing fluid communication  
10 of a portion of the first liquid from the first inlet to the first and second slide piston chambers and from the first and second slide pistons chambers to the first liquid inlet valve, so that in the first shifting position first fluid is  
15 directed thereby to operate the first liquid inlet valve to the first position thereof whereby the first fluid flows into the first flow channel to the drive piston chamber first end for moving the drive piston in the reverse direction and  
20 exhausting first liquid out the drive piston chamber second end from the second flow channel to the outlet flow channel, and so that as the drive piston subsequently contacts the second slide piston the first and second slide pistons are moved  
25 to the second shifting position wherein the first liquid is directed thereby to operate the first

liquid inlet valve to the second position thereof  
whereby the first liquid flows into the second flow  
channel to the drive piston chamber second end for  
moving the drive piston in the forward direction  
and exhausting first liquid out the drive piston  
chamber second through the first flow channel to the  
outlet channel whereby the drive piston is caused  
to reciprocate in the forward and reverse  
directions directing first fluid to the nozzle as a  
function of the volume of the drive piston chamber.

33 (Once Amended)

A beverage dispenser apparatus for dispensing through a nozzle  
a preestablished volume of syrup and a preestablished volume of a  
soda to be intermixed within said nozzle, said beverage dispensing  
apparatus comprising:

a valve body;

a syrup inlet for connection to a source of syrup;

a syrup chamber within the valve body, the syrup chamber  
having first and second ends;

a syrup piston which is movable in the syrup chamber in a  
forward direction toward the first end at the syrup  
chamber and in a reverse direction toward the second end  
of the syrup chamber;

means for connecting the syrup inlet and the first and second  
ends of the syrup chamber;

means for connecting the first and second ends of the syrup chamber and the nozzle;

a soda inlet for connection to a source of soda under pressure;

5 a soda chamber within the valve body, the soda chamber having first and second ends;

a soda piston which is movable in a forward direction toward the first end of the soda chamber and in a reverse direction toward the second end of the soda chamber, the soda piston being connected to the syrup piston so that the soda and syrup pistons move together in the forward direction and the reverse direction; and

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a completely liquid driven control piston [drive control] located between and connected between the soda inlet and the first and second ends of the soda chamber, and powered by soda pressure through the soda from the soda inlet, the control piston [drive control] having an on state in which soda under pressure is routed alternately to the first and second ends of the soda chamber to cause reciprocal motion of the soda and syrup pistons, and having an off state in which soda under pressure is routed to prevent movement of the soda and syrup pistons.

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34 (Once Amended)

25 The beverage dispensing apparatus of claim 33 wherein the control piston [drive control includes] comprises:



a first slide piston physically contactable and movable by the  
soda piston during movement in a forward direction; and  
a second slide piston physically contactable by the soda  
piston during movement in the reverse direction.

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36 (Once Amended)

The beverage dispensing apparatus of Claim 33 wherein the  
control piston [drive control] includes:

10 first and second soda inlet valves for selectively connecting  
the first and second ends, respectively, of the soda  
chamber to the soda inlet.

37 (Once Amended)

15 The beverage dispensing apparatus of Claim 36 and further  
comprising:

first and second soda outlet valves for selectively connecting  
the first and second ends, respectively, of the soda  
chamber to the nozzle.

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38 (Once Amended)

The beverage dispensing apparatus of Claim 37 wherein the  
control piston [drive control] includes:

25 first and second valves associated with the first and second  
ends of the soda cylinder for switching fluid connections  
in the control piston [drive control] each time the soda  
piston approaches one of the first and second ends.

40 (Once Amended)

The beverage dispensing apparatus of Claim 33 and further comprising:

an on/off control connected to the control piston [drive  
control] for determining whether the control piston  
[drive control] is in the on state or the off state.

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41 (New Claim)

A beverage dispenser apparatus for dispensing through a nozzle a preestablished volume of a syrup and a preestablished volume of a soda to be intermixed within said nozzle, said beverage dispensing apparatus comprising:

a soda inlet for connection to a source of soda under pressure;

a syrup inlet for connection to a source of syrup;

a syrup section connected to said syrup inlet utilizing a first drive piston, said first drive piston moves to cause dispensing of said preestablished volume of syrup into said nozzle, said first drive piston being movable in both a forward and reverse direction within a syrup drive piston chamber, said syrup in said preestablished volume to be dispensed during movement of said first drive piston in said forward direction and also during movement in said reverse direction;

a soda section utilizing a second drive piston, said second drive piston moves to cause dispensing of said preestablished volume of soda into said nozzle, said second drive piston being movable in both said forward and said reverse direction within a soda drive piston chamber, soda in said preestablished volume to be dispensed during movement of said second drive piston in said forward direction and also during movement in said reverse direction, said soda drive piston chamber being

spaced from said syrup drive piston chamber, wherein said first drive piston is connected to said second drive piston so both said first drive piston and said second drive piston move together in said forward direction and together in said reverse direction; and

a control piston connected between the soda inlet and the soda drive piston chamber, and powered by soda pressure, said control piston includes first and second slide pistons, the first slide piston being physically contactable and movable by said drive piston during movement in said forward direction, and the second slide piston being physically contactable by said second drive piston during movement in said reverse direction, the control piston having an on state in which soda under pressure is routed to alternate sides of the second drive piston to cause reciprocal motion of the first and second drive pistons, and having an off state in which soda under pressure is routed to prevent movement of the first and second drive pistons.

#### 42 (New Claim)

The beverage dispensing apparatus of Claim 41 wherein: said first and second slide pistons are physically connected together so as to be movable together in said forward direction and in said reverse direction.

43 (New Claim)

A beverage dispenser apparatus for dispensing through a nozzle a preestablished volume of syrup and a preestablished volume of a soda to be intermixed within said nozzle, said beverage dispensing apparatus comprising:

a valve body;

a syrup inlet for connection to a source of syrup;

a syrup chamber within the valve body, the syrup chamber having first and second ends;

a syrup piston which is movable in the syrup chamber in a forward direction toward the first end of the syrup chamber and in a reverse direction toward the second end of the syrup chamber;

means for connecting the syrup inlet and the first and second ends of the syrup chamber;

means for connecting the first and second ends of the syrup chamber and the nozzle;

a soda chamber within the valve body, the soda chamber having first and second ends;

a soda piston which is movable in a forward direction toward the first end of the soda chamber and in a reverse direction toward the second end of the soda chamber, the soda piston being connected to the syrup piston so that the soda and syrup pistons move together in the forward direction and the reverse direction; and

a control piston connected between the soda inlet and the first and second ends of the soda chamber, and powered by soda pressure, and comprising a first slide piston physically contactable and movable by the soda piston during movement in a forward direction;

a second slide piston physically contactable by the soda piston during movement in the reverse direction, the control piston further having an on state in which soda under pressure is routed alternately to the first and second ends of the soda chamber to cause reciprocal motion of the soda and syrup pistons, and having an off state in which soda under pressure is routed to prevent movement of the soda and syrup pistons.

44 (New Claim)

The beverage dispensing apparatus of Claim 43 wherein: the first and second slide pistons are physically connected together so as to be movable together in said forward direction and in said reverse direction.

45 (New Claim)

A dispensing valve for simultaneously dispensing from a nozzle a predetermined volume of first liquid and a predetermine volume of a second liquid, the beverage dispensing valve comprising:

a valve body having a first inlet for connection to a  
pressurized source of the first liquid and a second inlet  
for connection to a source of the second liquid;

5 a first section of the valve body having a drive piston, the  
drive piston being reciprocable within a drive piston  
chamber in a forward direction toward a drive piston  
chamber first end and in a reverse direction toward a  
drive piston chamber second end;

10 a second section of the valve body connected to the second  
liquid inlet having a driven piston, the driven piston  
being reciprocable within a driven piston chamber between  
the first and second ends thereof respectively and the  
driven piston chamber having a predetermined volume, the  
drive piston chamber being spaced from the driven piston  
15 chamber and the drive piston connected to the driven  
piston so that both the drive piston and the driven  
piston move together in a coordinated manner;

a fluid powered shifting system in the valve body for causing  
the drive piston to reciprocate in the drive piston  
20 chamber alternatively in the forward and reverse  
directions, the fluid powered shifting system including:  
first and second slide pistons, the first and second  
slide pistons being physically connected together so as  
to be movable in a coordinated manner, and the first  
25 slide piston being physically contactable and movable by  
the drive piston during movement thereof in the forward  
direction as the drive piston moves adjacent the drive

piston chamber first end for moving the first and second pistons to a first shifting piston, and the second slide piston being physically contactable and movable by the drive piston during movement thereof in the reverse direction as the drive piston moves adjacent the drive piston chamber second end for moving the first and second slide pistons to a second shifting piston;

a first liquid inlet valve in fluid communication with the first liquid inlet, the first liquid inlet valve operable by fluid pressure to a first position for directing the first fluid through a first flow channel into the drive piston chamber first end and for blocking flow of the first liquid through a second flow channel into the drive piston chamber second end, and operable by fluid pressure to a second position for directing the first fluid through the second flow channel into the drive piston chamber second end and for blocking flow of the first liquid through the first flow channel into the drive piston chamber first end;

an outlet flow channel for providing fluid communication from the first and second flow channels to the nozzle;

a first flow channel valve in the first flow channel, the first flow channel valve connected to the plurality of first fluid passageways and operable by the pressure of the first fluid presented thereby, wherein in the first shifting position of the first and second slide pistons,



the first flow channel valve is operated to a closed position so that the first liquid cannot flow to the outlet channel, and wherein in the second shifting position of the first and second slide pistons, the first valve is operated to an open position in which first liquid in the first flow channel is permitted to flow to the outlet channel; and

a first fluid control comprising a plurality of first fluid passageways for providing fluid communication of a portion of the first liquid from the first inlet to the first and second slide piston chambers and from the first and second slide pistons chambers to the first liquid inlet valve, so that in the first shifting position first fluid is directed thereby to operate the first liquid inlet valve to the first position thereof whereby the first fluid flows into the first flow channel to the drive piston chamber first end for moving the drive piston in the reverse direction and exhausting first liquid out the drive piston chamber second end from the second flow channel to the outlet flow channel, and so that as the drive piston subsequently contacts the second slide piston the first and second slide pistons are moved to the second shifting position wherein the first liquid is directed thereby to operate the first liquid inlet valve to the second position thereof whereby the first liquid flows into the second flow channel to the drive

piston chamber second end for moving the drive piston in the forward direction and exhausting the first liquid out the drive piston chamber second through the first flow channel to the outlet channel whereby the drive piston is caused to reciprocate in the forward and reverse directions directing first fluid to the nozzle as a function of the volume of the drive piston chamber;

a second flow channel valve in the second flow channel, the second valve connected to the plurality of first fluid passageways and operable by the pressure of the first fluid presented thereby, wherein in the first shifting position of the first and second slide pistons, the second valve is operated to an open position so that the first liquid is permitted to flow to the outlet channel, and wherein in the second shifting position of the first and second slide pistons, the second valve is operated to a closed position in which first liquid in the second flow channel cannot flow to the outlet channel; and

a second fluid flow control comprising a plurality of check valves and a plurality of second fluid passageways providing fluid communication between the second fluid inlet and the first and second ends of the driven piston chamber and providing fluid communication between the first and second ends of the driven piston chamber and the nozzle, for alternately directing the second fluid to and exhausting it from opposite sides of the driven

piston as the driven piston is moved in the forward and reverse directions by the drive piston, whereby the second fluid is dispensed out of the nozzle as a function of the volume of the driven piston chamber.

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46 (New Claim)

The dispensing valve as defined in Claim 45 and further including:

10 a solenoid valve operable to an on state and an off state, the solenoid valve interacting with a second plurality of first fluid passageways, the second plurality of first fluid passageways fluidly connected to a portion of the flow of the first liquid at the first liquid inlet and to the first and second slide pistons, the first and second  
15 valves and the first liquid inlet valve, so that in the off state equivalent pressure from the first fluid is applied to the first and second slide pistons, the first and second valves, and the first fluid inlet valve so that no movement of the drive piston in the first and  
20 second directions occurs, and so that in the on state first fluid is not delivered to the first and second slide pistons and the first fluid inlet valve in an equivalent manner so that reciprocal motion of the drive piston in the forward and reverse directions occurs.

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47 (New Claim)

The dispensing valve as defined in Claim 46 and further including a demand regulator fluidly connected between the second fluid inlet and the check valves so that the second fluid is delivered to the driven piston as demanded thereby.

48 (New Claim)

The dispensing valve as defined in Claim 45 and further including:

10 a second fluid flow control system including a plurality of check valves and a plurality of second fluid passageways providing fluid communication between the second fluid inlet, the check valves, and the first and second ends of the driven piston chamber, and fluid communication  
15 between the first and second ends of the driven piston chamber and the nozzle, for alternately directing the second fluid to and exhausting it from opposite sides of the driven piston as it is moved in the forward and reverse directions by the drive piston, whereby the  
20 second fluid is dispensed out the nozzle as a function of the volume of the driven piston chamber.

49 (New Claim)

a beverage dispenser apparatus for dispensing through a nozzle  
a preestablished volume of a syrup and a preestablished volume of  
a soda to be intermixed within said nozzle, said beverage  
5 dispensing apparatus comprising:

a soda inlet for connection to a source of soda under  
pressure;

a syrup inlet for connection to a source of syrup;

a syrup section connected to said syrup inlet utilizing a  
10 first drive piston, said first drive piston moves to  
cause dispensing of said preestablished volume of syrup  
into said nozzle, said first drive piston being movable  
in both a forward and reverse direction within a syrup  
drive piston chamber, said syrup in said preestablished  
15 volume to be dispensed during movement of said first  
drive piston in said forward direction and also during  
movement in said reverse direction;

a soda section utilizing a second drive piston, said second  
drive piston moves to cause dispensing of said  
20 preestablished volume of soda into said nozzle, said  
second drive piston being movable in both said forward  
and said reverse direction within a soda drive piston  
chamber, soda in said preestablished volume to be  
dispensed during movement of said second drive piston in  
25 said forward direction and also during movement in said  
reverse direction, said soda drive piston chamber being

generally aligned with but spaced apart from said syrup drive piston chamber, such that there is an air gap therebetween precluding possibility of soda entering the syrup drive piston chamber or syrup entering the soda drive piston chamber, mechanical coupling means for connecting said first drive piston to said second drive piston so both said first drive piston and said second drive piston move together in said forward direction and together in said reverse direction; and

a control piston connected between the soda inlet and the soda drive piston chamber, and powered by soda pressure, the control piston having an on state in which soda under pressure is routed to alternate sides of the second drive piston to cause reciprocal motion of the first and second drive pistons, and having an off state in which soda under pressure is routed to prevent movement of the first and second drive pistons.

50 (New Claim)

The beverage dispensing apparatus of Claim 49 wherein:

a control piston includes first and second slide pistons, the first slide piston being physically contactable and movable by said second drive piston during movement in said forward direction, and the second slide piston being physically contactable by said second drive piston during movement in said reverse direction.

51 (New Claim)

The beverage dispensing apparatus of Claim 49 wherein said control piston has a control piston chamber with end positions and having a piston therein and being a floating piston so that it is not biased to either of said end positions when in the off state, said control piston being a completely liquid driven control piston and powered by soda pressure through soda from the soda inlet.

52 (New Claim)

A beverage dispenser apparatus for dispensing through a nozzle a preestablished volume of syrup and a preestablished volume of a soda to be intermixed within said nozzle, said beverage dispensing apparatus comprising:

- a valve body;
- a syrup inlet for connection to a source of syrup;
- a syrup chamber within the valve body, the syrup chamber having first and second ends;
- a syrup piston which is movable in the syrup chamber in a forward direction toward the first end of the syrup chamber and in a reverse direction toward the second end of the syrup chamber;
- means for connecting the syrup inlet and the first and second ends of the syrup chamber;
- means for connecting the first and second ends of the syrup chamber and the nozzle;

a soda chamber within the valve body, the soda chamber having first and second ends;

a soda piston which is movable in a forward direction toward the first end of the soda chamber and in a reverse direction toward the second end of the soda chamber, said soda piston drive chamber being spaced apart from the syrup drive piston chamber, such that there is an air gap therebetween precluding possibility of soda entering the syrup drive piston chamber or syrup entering the soda drive piston chamber, the soda piston being connected to the syrup piston so that the soda and syrup pistons move together in the forward direction and the reverse direction; and

a control piston connected between the soda inlet and the first and second ends of the soda chamber, and powered by soda pressure, the control piston having an on state in which soda under pressure is routed alternately to the first and second ends of the soda chamber to cause reciprocal motion of the soda and syrup pistons, and having an off state in which soda under pressure is routed to prevent movement of the soda and syrup pistons.

### 53 (New Claim)

The beverage dispensing apparatus of Claim 51 wherein said control piston has a control piston chamber with end positions and having a piston therein and being a floating piston so that it is



not biased to either of said end positions when in the off state, said control piston being a completely liquid driven control piston and powered by soda pressure through soda from the soda inlet.

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54 (New Claim)

A beverage dispenser apparatus for dispensing through a nozzle a preestablished volume of a syrup and a preestablished volume of a soda to be intermixed within said nozzle, said beverage dispensing apparatus comprising:

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a soda inlet for connection to a source of soda under pressure;

a syrup inlet for connection to a source of syrup;

a syrup section connected to said syrup inlet utilizing a

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first drive piston, said first drive piston moves to cause dispensing of said preestablished volume of syrup into said nozzle, said first drive piston being movable in both a forward and reverse direction within a syrup drive piston chamber, said syrup in said preestablished volume to be dispensed during movement of said first drive piston in said forward direction and also during movement in said reverse direction;

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a soda section utilizing a second drive piston, said second drive piston moves to cause dispensing of said preestablished volume of soda into said nozzle, said second drive piston being movable in both said forward

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and said reverse direction within a soda drive piston chamber, soda in said preestablished volume to be dispensed during movement of said second drive piston in said forward direction and also during movement in said reverse direction, said soda drive piston chamber being spaced from said syrup drive piston chamber, wherein said first drive piston is connected to said second drive piston so both said first drive piston and said second drive piston move together in said forward direction and together in said reverse direction; and

a control piston connected between the soda inlet and the soda drive piston chamber, and powered by soda pressure, the control piston having a control piston chamber with end positions and a drive piston therein and also having an on state in which soda under pressure is routed to alternate sides of the second drive piston to cause reciprocal motion of the first and second drive pistons, and having an off state in which soda under pressure is routed to prevent movement of the first and second drive pistons, said control piston being a floating piston so that it is not biased to either end of said end positions when in the off state.

55 (New Claim)

A beverage dispenser apparatus for dispensing through a nozzle a preestablished volume of syrup and a preestablished volume of a soda to be intermixed within said nozzle, said beverage dispensing apparatus comprising:

a valve body;

a syrup inlet for connection to a source of syrup;

a syrup chamber within the valve body, the syrup chamber having first and second ends;

a syrup piston which is movable in the syrup chamber in a forward direction toward the first end of the syrup chamber and in a reverse direction toward the second end of the syrup chamber;

means for connecting the syrup inlet and the first and second ends of the syrup chamber;

means for connecting the first and second ends of the syrup chamber and the nozzle;

a soda chamber within the valve body, the soda chamber having first and second ends;

a soda piston which is movable in a forward direction toward the first end of the soda chamber and in a reverse direction toward the second end of the soda chamber, the soda piston being connected to the syrup piston so that the soda and syrup pistons move together in the forward direction and the reverse direction;

the soda piston drive chamber being spaced apart from the  
syrup drive piston chamber, such that there is an air gap  
therebetween precluding possibility of soda entering the  
syrup chamber or syrup entering the soda chamber; and  
5 a control piston connected between the soda inlet and the  
first and second ends of the soda chamber, and powered by  
soda pressure, the control piston having an on state in  
which soda under pressure is routed alternately to the  
first and second ends of the soda chamber to cause  
10 reciprocal motion of the soda and syrup pistons, and  
having an off state in which soda under pressure is  
routed to prevent movement of the soda and syrup pistons.

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